

REMARKS

Claims 1-121 were pending in this application when the present Office Action was mailed, with claims 16, 90-107 and 114 withdrawn from consideration. Claims 1, 33, 47, 58, 60, 68, 77, 108, 115 and 119 have been amended to clarify certain aspects of these claims. New claims 122-126, corresponding to claims indicated to be allowable if rewritten in independent form, have been added.

In the Office Action mailed June 13, 2003, claims 22-32, 40-46 and 84-89 were allowed, claims 9, 14, 17, 18, 35, 64, 66, 117, 118 and 120 were objected to, and the remaining claims were rejected. More specifically, the status of the application in light of this Office Action is as follows:

(A) Claims 47-57 and 108-113 stand rejected under 35 U.S.C. § 112, second paragraph as being allegedly indefinite;

(B) Claims 1, 2, 5-8, 12, 13, 15, 19-21, 33, 34, 36, 38, 39, 47-51, 55-63, 65, 67-83, 108-113, 115, 116, 119 and 120 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,171,467 to Weihs et al. ("Weihs");

(C) Claims 4 and 37 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Weihs;

(D) Claims 10, 11, 53 and 54 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Weihs in view of U.S. Patent No. 6,039,633 to Chopra ("Chopra");

(E) Claims 22, 32, 47-57 and 84-89 are allowed; and

(F) Claims 9, 14, 17, 18, 35, 64, 66, 117, 118 and 120 stand objected to as being dependent upon a rejected base claim but were indicated to be allowable if rewritten to be in independent form.

The undersigned attorney wishes to thank the Examiner for engaging in a telephone conference on September 9, 2003, during which the Examiner agreed that clarifying amendments discussed for claims 1, 33, 58, 60, 68, 77, 115 and 119 distinguish these claims over the applied references. The clarifying amendments have

been incorporated into these claims. The following remarks summarize and expand upon the agreement reached between the Examiner and the undersigned attorney.

A. Response to the Section 112 Rejections

Independent claims 47 and 108, and the claims depending therefrom, were rejected under 35 U.S.C. § 112, second paragraph, as being allegedly indefinite. In particular, the Examiner objected to the term "greater" in claim 47 and the term "less" in claim 108.

Claim 47, which is directed to a method for removing conductive material from a face surface of a microelectronic substrate, has been amended to clarify that the electrical current applied to the conductive material also passes through first and second electrodes that are spaced apart from the first surface of the microelectronic substrate. As stated in the preamble of claim 47, the conductive material is capable of oxidizing at a first rate when exposed to an oxidizing chemical agent, and the method includes "oxidizing the conductive material of the microelectronic substrate at a second rate greater than the first rate by applying an electrical current to the conductive material to form an oxidized material. . . ."

The fact that claim language, including terms of degree, may not be precise, does not automatically render the claim indefinite under 35 U.S.C. § 112, second paragraph. (MPEP at § 2173.05(b).) Acceptability of the claim language depends on whether one of ordinary skill in the art would understand what is claimed, in light of the specification. (*Id.*) When a term of degree is presented in a claim, first a determination is to be made as to whether the specification provides some standard for measuring that degree. If it does not, a determination is made as to whether one of ordinary skill in the art, in view of the prior art and the status of the art, would be nevertheless reasonably apprised of the scope of the invention. (*Id.*) Claim 47 complies with the requirements of 35 U.S.C. § 112 and MPEP § 2173.05(b). For example, the specification provides at page 25 that "the down force required to remove the oxidized material can be less than the down force required by techniques that do not include an electrolytic process." This section of the specification also provides that "the apparatus described above with reference to Figures 9-11 can oxidize and remove materials other

than platinum at higher rates and/or with lower down forces than are typically required with conventional CMP apparatuses." Accordingly, the specification clearly supports the claim feature of "oxidizing the conductive material of the microelectronic substrate at a second rate greater than the first rate by applying an electrical current to the conductive material" by providing a basis for comparison that includes conventional CMP apparatuses that do not include an electrolytic process. Accordingly, the Section 112 rejection of claim 47 should be withdrawn. Claims 48-57, which depend from claim 47, fulfill the requirements of Section 112, second paragraph, for the reasons discussed above and for the additional features of these dependent claims.

Claim 108 is directed to a method for removing conductive material from a microelectronic substrate, with the conductive material capable of being removed at a selected rate when subjected to a first down force. The method includes "removing an oxidized portion of the conductive material with a second force that is normal to the polishing surface of the polishing pad and is less than the first force, by applying an electrical current to the conductive material to form the oxidized portion." For the reasons discussed above with reference to claim 47, the specification provides support for the basis of comparison recited in claim 108. Accordingly, the Section 112 rejection of claim 108 should be withdrawn. Claims 109-113, which depend from claim 108, comply with the requirements of 35 U.S.C. § 112 and MPEP § 2173.05(b) for the reasons discussed above and for the additional features of these dependent claims. Accordingly, the Section 112 rejection of these claims should be withdrawn.

B. Response to the Section 102 Rejections

Claim 1 has been amended to clarify that the electrical current oxidizing the conductive material passes through the first and second electrodes, which are spaced apart from the face surface of the microelectronic substrate. As agreed to by the Examiner during the September 9, 2003 telephone conference, claim 1 patentably distinguishes over the applied reference for at least the reasons discussed above and accordingly, the Section 102 rejection of claim 1 should be withdrawn.

Claims 2, 5-8, 12, 13, 15 and 19-21 depend from claim 1. Accordingly, the Section 102 rejections of these claims should be withdrawn for the reasons discussed

above with reference to claim 1 and for the additional features of these dependent claims.

Claim 16, which depends from claim 1, was previously withdrawn in response to a species restriction requirement. Claim 16 now depends from an allowable generic claim and should be allowed for the reasons discussed above and for the additional features of this claim.

Independent claims 33, 47, 58, 60, 68, 77, 115 and 119 have been amended in a manner generally similar to that described above with reference to claim 1. Claim 60 has also been amended to further clarify the relationships between the claimed elements. Accordingly, the Section 102 rejections of these claims should be withdrawn. Claims 34, 36, 38, and 39 depend from claim 33, claims 48-51 and 55-57 depend from claim 47, claim 59 depends from claim 58, claims 61-63, 65 and 67 depend from claim 60, claims 69-76 depend from claim 68, claims 78-83 depend from claim 77, claim 116 depends from claim 115, and claims 120 and 121 depend from claim 119. The Section 102 rejections of these dependent claims should be withdrawn for the reasons discussed above and for the additional features of these dependent claims.

Claim 108, discussed above in the context of 35 U.S.C. § 112, is directed to a method for removing conductive material from a microelectronic substrate. The conductive material is capable of being removed at a selected rate when engaged with a polishing pad and subjected to a first force normal to a polishing pad surface of the polishing pad. The method includes coupling the conductive material to a source of electrical potential, contacting the microelectronic substrate with a polishing surface of a polishing pad, and removing an oxidized portion of the conductive material with a second force that is normal to the polishing surface of the polishing pad and is less than the first force, by applying an electrical current to the conductive material to form the oxidized portion. Weihs fails to disclose or suggest reducing a normal force applied to a microelectronic substrate by applying an electrical current to the substrate. In fact, Weihs teaches away from this feature by disclosing the formation of a wear-resistant surface layer through growth of an oxide layer (Weihs at column 3 at lines 34-40), which would increase the normal force necessary for material removed. Accordingly, the

Section 102 rejection of claim 108 should be withdrawn. Claims 109-113 depend from claim 108. Accordingly, the Section 102 rejection of these claims should be withdrawn for the reasons discussed above and for the additional features of these dependent claims.

Claim 114, which depends from claim 108, was previously withdrawn in response to a species restriction requirement. Claim 114 now depends from an allowable generic claim and should be allowed for the reasons discussed above and for the additional features of this claim.

C. Response to the Section 103 Rejection of Claims 4 and 37

Claim 4 depends from claim 1 and claim 37 depends from claim 33. As discussed above, the Examiner agreed during the September 9, 2003 telephone conference that Weihs fails to disclose or suggest the features of these independent claims. Claims 4 and 37 are accordingly patentable over the applied reference for the reasons discussed above with reference to these independent claims and for the additional features of claims 4 and 37, respectively.

D. Response to the Section 103 Rejection of Claims 10, 11, 53 and 54

Claims 10, 11, 53 and 54 were rejected under 35 U.S.C. § 103 as being unpatentable over Weihs in view of Chopra. These claims depend from the claims indicated by the Examiner in the September 9 telephone conference to be patentable over the applied references. Accordingly, the Section 103 rejection of these claims should be withdrawn.

E. Response to the Indication of Allowed Claims

Claims 22-32, 40-46 and 84-89 were allowed, and have not been amended in the present paper.

F. Response to the Indication of Allowable Claims

Claims 9, 14, 17, 18, 35, 64, 66, 117, 118 and 120 were indicated to be allowable if rewritten to be in independent form. Claims 17, 18, 35, 64, and 66 have been redrafted to be in independent form as claims 122-126, respectively. Accordingly, these claims are now in condition for allowance.

G. Conclusion

In view of the foregoing, the claims pending in the application comply with the requirements of 35 U.S.C. § 112 and patentably define over the applied art. A Notice of Allowance is, therefore, respectfully requested. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call the undersigned at (206) 359-3257.

Respectfully submitted,

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